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Eighth meeting of the Technical Preparatory Committee of the Whole

Addis Ababa, Ethiopia
13 - 20 April 1987

Item 7 of the provisional agenda*

ECONOMIC COMMISSION FOR AFRICA

Twenty-second session of the Commission/ thirteenth meeting of the Conference of Ministers

Addis Ababa, Ethiopia
23 - 27 April 1987

Item 6 of the provisional agenda**

LC/NAIROBI

REPORT OF THE SIXTH UNITED NATIONS REGIONAL CARTOGRAPHIC CONFERENCE FOR AFRICA

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* E/ECA/TPCW.8/1.

** E/ECA/CM.13/1.

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A. Attendance and organization of work

1. The sixth United Nations Regional Cartographic Conference for Africa was held in Addis Ababa, Ethiopia, from 10 to 17 November 1986. It was held in accordance with resolution 1(V) of the fifth Conference and the report of the Conference was adopted by the ECA Conference of Ministers in 1984.

2. The Conference was attended by 171 participants from 30 member States, 12 observer countries and 10 international/intergovernmental organizations including the United Nations Headquarters and its agencies.

Election of officers

3. The Conference elected the following officers and set up three Technical Committees:

Chairman	Mr. Asfaw Panta, Ethiopia
First Vice-Chairman	Mr. O.L. Akhdar, Morocco
Second Vice-Chairman	Mr. W.O. Leba, Zaire
Rapporteur	Mr. P. Moby-Etia, Cameroon

Technical committees

Committee I:	Chairman	Mr. N. Saadi (Algeria)
	Vice-Chairman	Mr. A. Bassole (Burkina Faso)
	Rapporteur	Mr. B. H. Morebodi (Botswana)
Committee II:	Chairman	Mr. D. Kamau (Kenya)
	Vice-Chairman	Mr. Medhat El-Kady (Egypt)
	Rapporteur	Mr. F. Fofana (Côte d'Ivoire)
Committee III:	Chairman	Mr. M. Bizenga (Congo)
	Vice-Chairman	Mr. T. Essid (Tunisia)
	Rapporteur	Mr. J.K.W. Musabula (Zambia)

Map exhibition

4. The Chairman of the Conference invited all participants to visit the cartographic and remote sensing exhibition which formed part of the commemorative activities of the "Year of Cartography in Africa" at regional level.

5. The following were the exhibitors: ECA Map Documentation and Reference Centre; Ethiopian Mapping Agency; the Survey of Kenya; the Regional Centre for Services in Surveying, Mapping and Remote Sensing; Peoples' Republic of China; Institut géographique national of France; Ordinance Survey of the United Kingdom; Geodetic and Cartography Institute of Poland; Zeiss of the Federal Republic of Germany; and Wild of Switzerland.

6. The exhibits showed the disparity of map specifications for topographic maps which emphasized the need to standardize; also a wide range of thematic maps and atlases were on display; notable among the exhibits were maps for the near blind and the totally blind. There were also posters showing a wide range of surveying, photogrammetric and drawing equipment.

B. Agenda

7. The Conference unanimously adopted the following agenda which had previously been proposed by the Standing Committee appointed by resolution 2(V) of the fifth Conference charged with the responsibility of ensuring effective administration and technical preparations for future regional cartographic conferences:

1. Opening of the Conference.
2. Election of officers.
3. Adoption of the agenda and organization of work.
4. The status of cartography in Africa.
5. Standardization of specifications for topographic maps in Africa.
6. Manpower development.
7. Technical co-operation.
8. Integrated continental geodetic and gravimetric networks in Africa.
9. Research and development on recent technicques in cartography and remote sensing.
10. The Year of Cartography in Africa.
11. Adoption of the report of the Conference.
12. Date and venue of the seventh Conference.
13. Closing of the Conference.

8. The Conference referred agenda items 6 and 7, 8 and 9 for consideration by the three Technical Committees respectively. Each Technical Committee conducted its assignment in plenary. However, the Conference considered agenda items 2 to 5 and 10 at its plenary meetings.

C. Account of proceedings

9. Before the Conference was declared open, it observed one minute silence in remembrance of the late Alpha Cissé of Côte d'Ivoire for his remarkable contribution to the development of cartography in Africa.

10. Comrade Mersie Ijigu, Minister at the Office of the National Committee for Central Planning declared the Conference open. In his opening address he expressed hearty welcome to all the participants on behalf of the Government of Socialist Ethiopia and wished them a happy stay in Addis Ababa through the duration of the Conference. He underlined the role played by the implementation of the recommendations of all previous cartographic conferences both by member States and ECA in broadening the scope of cartography to development in Africa. He expressed the wish that fruitful contributions from the Conference would come up with recommendations which would dynamize further cartography and remote sensing in national undertakings in the context of Africa's strategy for development, geared to providing means to achieving self-sufficiency in qualified manpower, and sound geo-data base essential for economic planning and development.

11. Comrade Mersie Ijigu also performed the opening ceremony of the cartographic exhibition which formed part of the commemorative activities for the Year of Cartography in Africa.

12. In his opening statement, the Executive Secretary of the Economic Commission for Africa thanked the Government of Socialist Ethiopia for accepting the invitation to declare the Conference open. He extended hearty welcome to all participants and outlined the importance of the present Conference which was expected to examine the place of cartography and remote sensing in the development of the African economies and for providing geographic information data as inputs into the accelerated implementation of Africa's priority programmes as measures for achieving the tenets of the Lagos Plan of Action for the social and economic development of Africa.

13. He expressed his desire for the observance of the Year of Cartography in Africa which because of delay of some member States in organizing their national committees for the Year, was extended to the end of April 1987.

The status of cartography in Africa (agenda item 4)

14. A representative of the secretariat presented the report on the implementation of resolutions adopted by the fifth United Nations Regional Cartographic Conference for Africa (E/ECA/NRD/CART/17). The purpose of the report was to give an account of the actions taken towards the implementation of each resolution. While some resolutions called for implementation by ECA singularly or in co-operation with other agencies, others were directed to regional or international organization for implementation.

15. Under the same agenda item, document E/ECA/NRD/CART/18 entitled "Mapping situation in Africa" was introduced. The paper gave a synthesis of a study carried out and which highlighted how much of the African continent had been mapped at basic topographical scales essential for planning. The report revealed that the situation in Africa fell far short of Africa's needs for maps in order to carry out meaningful planning and development. Member States and other mapping agencies were called upon to provide the ECA secretariat regularly with information on the status of their mapping in the form of published reports or maps so as to make it possible to undertake a more realistic appraisal of the mapping situation in Africa.

16. Representatives of a number of ECA member States presented their country reports which contained accounts of the activities undertaken during the period between the fifth and the sixth Conferences.

17. Document E/ECA/NRD/CART/42 entitled "Cartographic activities in Ethiopia" was presented by the representative of the Ethiopian Mapping Agency, which is the principal national cartographic institution in the country. The report dealt with activities in geodetic survey, mapping and geographic research. The representative mentioned that there were other organizations in the country which carry out special purpose mapping.

18. The Agency carried out air photography, providing large-scale photographs for major towns and other specific development schemes in regions of high resource potential in over 30 locations. In map production, the country attained 22 per cent of map coverage at 1:50,000. Other mapping projects undertaken included land use management and work on the multicolour atlas maps of the country were due for publication in 1987. Since the fifth Conference, training had been stepped up providing both in-service and overseas training in various key cartographic disciplines. The report showed that additional equipment had been procured to replace or supplement existing ones.

19. In presenting document E/ECA/NRD/CART/52, the representative of Gabon mentioned that the national cartographic institute was established by government decree in 1983. This was followed by an agreement between Gabon and France which made a provision for proper growth of the young institution, including training of manpower needed both in France and in Gabon as well as equipping the institution, and in undertaking, in the meantime, cartographic activities on behalf of the Government. Concerning geodetic work, 120 points were established by Doppler method, eight of which were within the ADOS programme. This was possible with the MAGNAVOX 1502 MX acquired by the institution. Up to mid-1983, some considerable levelling had been undertaken, in addition to the production of topographic maps at both 1:50,000 and 1:200,000.

20. In presenting his national report, E/ECA/NRD/CART/51, the representative of Zambia outlined ongoing cartographic activities of the Survey Department of Zambia. These covered mapping, geodetic and cadastral surveys as they fell under each established section of the Department. It was reported that a Zambian National Remote Sensing Committee had been formed and was being supported by the Department. Training of the staff was undertaken not only in the form of refresher courses, but also in new areas such as application of remote sensing techniques to mapping for the implementation of different projects.

21. The representative of Togo reported that the Government had established the National Directorate of Cartography and Cadastre in 1980 as its national cartographic institution. Most of the existing geodetic work as well as the production of existing topographic map series (at the scales of 1:50,000 and 1:200,000) were undertaken in the 1950s by France. Some of the maps were recently updated under technical co-operation. The country's first-ever triangulation network consisting of 11 first-order and 70 second-order points were established by Doppler method. In addition to the existing air photographic coverage, panchromatic infra-red air photography of the coastal areas was flown to monitor coastal erosion. With regard to cadastral survey, no systematic cadastral service existed in Togo due to lack of a triangulation network to provide reliable controls. As far as manpower was concerned, Togo did not have a training institute of its own to train its professionals and technicians. Nevertheless, all its senior staff were and are being trained abroad and others would in the near future have in-service training in the country. In order to correct the imbalance, a five-year development plan for geodetic work, map preparation, training and the establishment of a national cadastre had been prepared for implementation.

22. The national report, E/ECA/NRD/CART/74, presented by Madagascar revealed that the Institut national de géodesie et cartographie (FTM) had undergone a difficult period due to lack of resources. But with UNDP assistance in the form of equipment as well as consumables, FTM was able to conduct an analytical aerotriangulation. However, the photogrammetric section lacked clients to make full use of the services FTM could provide. In connection with air photography, FTM obtained an airphoto camera which was mounted in a light aircraft for medium altitude photography. Also with UNDP providing modern equipment, it was possible to undertake various bathymetric surveys. In the field of mapping, the country achieved 99 per cent map coverage at 1:100,000 and 20 per cent at 1:50,000. As regards thematic mapping, a number of charts were published at various scales; an example was the wall map of Africa at the scale of 1:13,850,000 which conforms to toponymic specifications as recommended by the United Nations Conference on the Standardization of Geographical Names. It was also reported that no remote sensing activity commenced in spite of Madagascar having had a number of its nationals trained. Nevertheless there was great promise in the future for space geodesy, remote sensing and computer-assisted cartography playing a prominent part in mapping the country's coastal areas.

23. The representative of Chad introduced document E/ECA/NRD/CART/101 entitled "Report on status of cartography in Chad" and informed the Conference that his country had been in a state of war since independence; as a result, Chad was not in a position to establish a viable cartographic institution necessary for development. There existed, however, a cadastral office which looked after cartographic activities in general. The department lacks resources to undertake meaningful cartographic tasks. With regard to map coverage, maps at 1:200,000 cover the entire country, while only a small region in the south of the country is covered at scale 1:50,000. However, these two coverages needed updating, having been published by France several years ago. Concerning classical geodetic survey, a few astronomical points exist and these were also established by France decades ago. In order to meet today's developmental demands, Chad was seriously studying how to set up its own national cartographic institution. Concerning training, surveyors were being trained in France, Côte d'Ivoire and some in the country.

24. In his presentation (document E/ECA/NRD/CART/111), the representative of Burkina Faso informed the Conference that the country had maps to meet most of its needs at most scales both topographic and thematic. There were a number of control points established by space geodesy; among these is the line of the 12th parallel supplemented by several astronomical points and a 3,500-km length of precise levelling. With regard to remote sensing, Burkina Faso, being the host country of the Ouagadougou Regional Remote Sensing Centre, had a number of its nationals trained in remote sensing at the Centre. Besides the training that was being given in the country, higher training is undertaken abroad mainly in France. Reacting to the call in the Lagos Plan of Action, the Government had taken steps to complete mapping at 1:50,000 and to equip its national cartographic institution to be self-reliant.

25. The representative of Morocco, introducing his country's national report, E/ECA/NRD/CART/81, gave a brief account of the activities undertaken in establishing precise triangulation and lines of levels covering the whole country. Also reported was the progress on mapping activities at large scales to meet requests for agricultural and industrial investment. The centralization of data in one department had facilitated easy retrieval of data for mapping and geodetic work. In the field of geodesy, several triangulation point, levelling circuits and controls points within the ADOS programme were established. One important joint geodetic study undertaken concerned the projected link with Gibraltar. Morocco played an active role in the work of the United Nations-sponsored Conferences on the Standardization of Geographic Names including hosting one of the seminars for Arab-speaking countries in 1984. Morocco, having proved the value of remote sensing in the revision of maps, set up a remote sensing section side by side with that of photogrammetry. It was also reported that various levels of courses were offered in the Kingdom and the number of attendants had increased.

26 The representative of Senegal presented document E/ECA/NRD/CART/96 which contained information on the achievements in mapping, densification of geodetic networks by Doppler method, extension of lines of levels and in the use of remotely sensed data for various cartographic projects. Concerning training, Senegal made use of regional as well as overseas training institutions in order to strengthen its capacity towards manpower self-sufficiency as recommended in the Lagos Plan of Action.

27. Document E/ECA/NRD/CART/75 presented by the representative of Tunisia highlighted efforts made to modernize geodetic networks by a combination of Doppler and classical methods, as well as extending levelling networks. During the period 1983-1986 Tunisia obtained complete airphoto coverage. The products were treated through numeric restitution by semi-analytical method and orthophoto maps produced. The photogrammetric section was strengthened further by the equipment provided by the Federal Republic of Germany. With regard to remote sensing, it was reported that a National Outer Space Affairs Commission had been created comprising different users. Tunisia carried out base map revision employing SPOT images in the framework of SPOT image evaluation exercise. In the field of map preparation, a number of topographical map sheets and several thematic maps were published, notable among which was the atlas on population movement. The World Bank was helping in the study of Tunisian cadastre in order to modernize it so as to introduce a cost-effective cadastral survey programme as well as bring about equitable methods of property distribution and assessment for taxation. Concerning standardization of geographic names, a committee was created to adopt the usage of the Beirut Arabic system as recommended by the United Nations Conference on the Standardization of Geographical Names. It was reported that all training of professional staff took place abroad.

28. The representative of Algeria presented his country's report (document E/ECA/NRD/CART/77) and gave a brief account of the evolution of the Institut National de Cartographie (INC) which was established in 1967. The terms of reference of the Institute were, among others, establishment of geodetic, levelling and gravimetric networks; photogrammetry and remote sensing; air-photographic coverage, computation, publication and revision of base maps. The Institute acquired necessary capabilities in the aforementioned disciplines through effective participation in the national development plans. A medium-term programme had been initiated, focusing on adequate contribution of geographic information inputs into the country's development planning process. He concluded by stating that first-order observations in levelling as part of the production programme aimed at achieving an accuracy greater than 1 mm/km would commence in 1987.

29. The representative of Kenya presented document E/ECA/NRD/CART/105 which detailed the country's cartographic activities since the fifth Conference in 1983 and which contained a comprehensive account of the ongoing activities. The Conference was informed that the Survey of Kenya which is the official surveying and mapping agency was principally preoccupied with surveys for land adjudication and settlement. The bulk of the country's basic topographic mapping was carried out under technical co-operation with Britain, Japan and Canada. Little activity was undertaken in the area of geodetic surveying due to the priority which the Government accorded to cadastral surveys for certain development survey programmes which resulted in some 30,000 company and co-operative farm shareholders possessing certificates of ownership to over 72,000 hectares. Under the ADOS project, the country acquired 14 Doppler fixes, again under technical assistance. In collaboration with the Regional Centre for Services in Surveying, Mapping and Remote Sensing (RCSSMRS), the Survey of Kenya demarcated ranch holdings in the coastal province of Kenya by Doppler positioning methods. Geodetic levelling of 80 km out of a circuit of 250 km was completed. Seven sheets at 1:50,000 were completed during the reporting period in addition to 430 sheets which existed at the beginning of 1983 giving the country over 50 per cent of map coverage at that scale. The fourth edition of the national atlas, when published in early 1987 would form part of the national commemorative activities for the Year of Cartography in Africa. Training and education for surveyors, cartographers, photogrammetrists and photolithographers, technicians, technologists and professional levels were conducted in the country and there were research facilities for post-graduate degrees up to doctorate. Other nationals pursued post-graduate courses in surveying, cartography and photogrammetry at overseas institutions of higher learning in Canada, USA, Britain and the Netherlands.

30. The report presented by the Niger (document E/ECA/NRD/CART/107) showed that, due to a vast desert region, the country had communication difficulties and scarcity of underground water, a situation complicated by the absence of cartographic information and data as a result of any viable cartographic institution. Nevertheless, with the help of France alongside that of international agencies, the Niger was able to have complete aerial photographic cover which made it possible to have complete map coverage at 1:200,000 and 1:100,000 and a partial coverage at 1:50,000 in the south of the country. Concerning geodetic survey, there existed 16 Doppler points eight of which were within the ADOS programme. There are 18

traverse control points along the 12th parallel. There was also precise levelling for a distance of 7,000 km. Remotely sensed data was used in the Niger River for agricultural development projects. Training of nationals took place in France, Mali and Senegal. Future perspectives envisage (a) computation for Doppler points towards the unification of the networks; (b) establishment of a national cartographic institute, followed by the installation of a viable photolaboratory; (c) acquisition of photogrammetric equipment; and (d) the extension of map coverage at 1:50,000.

31. The representative of Côte d'Ivoire presented document E/ECA/NRD/CART/39 which gave an overview of cartographic activities in the country. Progress was reported in the establishment of geodetic control points by Doppler method and in the extension of precise levelling network. Little was accomplished in the area of aerial photography because of the grounding of the only survey aircraft. The Geographic Institute of Côte d'Ivoire continued to strengthen its manpower capacity and acquired modern equipment under technical co-operation with the Government of the Federal Republic of Germany. The major problem facing the Institute was equipment maintenance. A national remote sensing committee was set up. Institutions abroad, namely IGN of France, ITC of the Netherlands and IFAG of West Germany, continued to assist in the training of Ivorians in cartography. The representative reconfirmed the offer of his Government made at Yamoussoukro in April 1986 to regionalize its training centre (Ecole nationale supérieure des travaux publics). Efforts were underway to revitalize the Geographic Institute and an appraisal exercise was in the process.

32. Being the first time Lesotho was represented at a Regional Cartographic Conference for Africa, the representative gave a brief description of cartographic activities in his country mainly involving the work of the Department of Lands, Surveys and Physical Planning (document E/ECA/NRD/CART/90) concerning geodesy, a second order triangulation network was established in the early 1950s followed by successive breakdown to lower order by Britain. Reference marks in urban areas mainly for cadastral surveys had been established. Since 1979 the country had five Doppler fixes which, after verification, were found to meet ADOS standards. With regard to precise levelling, a line runs from the south through the lowlands in the north and both ends connect to fundamental benchmarks in the Republic of South Africa. The country had complete aerial photographic and basic topographic map coverage. Following the introduction of a new land survey legislation in 1979 the Survey Division carried out the layout surveys of residential and industrial property throughout the country. On training, nationals received training in various cartographic disciplines outside the country. With Swiss assistance, work was underway to establish map production and reproduction units which would give the country the capacity to carry out its own mapping and reproduction.

33. Document E/ECA/NRD/CART/68 on cartographic activities presented by the representative of the Congo indicated that in June 1986 as a result of a Government decree, the Geographic Institute of the Congo was strengthened. In the field of aerial photography, only a small area had been photographed since 1983. The country still depended on some coverage that had started in 1945 but which remains uncompleted due to lack of funds and complicated by a dominant forest feature which gave rise to permanent cloud cover over the country. The satellite photographs taken over the Congo in the course of the metric camera experiment also had 75 per cent cloud cover. Before the establishment of Doppler points within the ADOS programme which are located in the five principal cities in addition

to 31 others elsewhere in the territory, the Congo did not have a geodetic control network. No levelling work was undertaken. The only known gravimetric point which is in Brazzaville, was measured within the framework of a world campaign for the study of tidal phenomenon on the earth. Little was achieved in topographic and thematic mapping by the services in the Congo. Remote sensing was being given a lot of attention and as a result, a national cartographic and remote sensing committee was being set up. The report brought up the request by the Congo to be assisted in setting up a regional centre for training in cartographic disciplines which have not been catered for at other regional centres.

34. The report of Ghana contained in document E/ECA/NRD/CART/108 gave a summary of detailed activities undertaken by the Ghana Survey Department for the period 1983 through 1986 in which it was reported that after several years, cartography received serious attention from the Government. However, some financial policies seriously impeded the Department's recovery and physical development programmes. Moreover, many trained personnel had left the Department for better opportunities elsewhere. Another aspect of personnel deficiency was the shortage of skilled survey labourers. Regarding geodetic activities, Ghana is adequately covered with both primary and secondary order networks. During the last four years, activities in precise levelling were pursued with vigour bringing the total distance of precise levelling to 4,064 km. Ghana had eight Doppler points within the ADOS programme and a strong gravity survey net. Concerning technical co-operation, France provided photo coverage to be used in the investigation of coastal erosion. Ghana, in co-operation with its neighbours, was able to reactivate border re-demarcation activities. During the period 1983-1984, more attention was paid to manpower development with training being given both locally and abroad for professionals as well as for technicians.

35. The national report of Nigeria in document E/ECA/NRD/CART/110 gave a distinction of responsibilities between the Federal Survey Department and those of individual State survey organizations. While the Federal Survey did all the major geodetic, mapping, airphotography, etc, the State agencies concentrated on production of township maps. The country as a whole witnessed progress in the extension of geodetic networks including active participation in the ADOS programme with the help of the United States of America. Levelling and gravity surveys showed an exceptional leap forward. In addition, a number of topographical and cadastral surveys had resulted in the publication of several maps at various scales. These achievements were matched by publications of specialized maps on geology and hydrogeology. Remote sensing was largely in the application for resource mapping, forest inventory and land use studies. Concerning training, it was reported that there had been a slump because of austerity measures in the country.

36. In presenting document E/ECA/NRD/CART/87, the representative of Cameroon pointed out that although a lot of work had been done, more attention needed to be given to cartographic activities. Since independence, much progress had been made but more funds were needed for acquisition of the necessary equipment and development of an adequate work force in all fields of cartography. He elaborated on the status of geodesy, precise levelling and gravimetry, as well as the accomplishments in topographical and thematic mapping at various scales. The report covered other publications such as atlas maps and more importantly geological, hydrogeological, forest inventory and land use. A lot of activities were joint efforts with overseas organizations, mainly in France.

37. The representative of the African Association of Cartography presented a report (E/ECA/NRD/CART/27) on AAC activities as they concerned the implementation of various recommendations and resolutions of the fifth United Nations Regional Cartographic Conference for Africa. The Secretary-General of the AAC concentrated on activities which he said could not have been implemented without intra-African or international co-operation. He highlighted the efforts of establishing a consortium for ADOS data processing which had already built up a large magnetic tape library containing all data already integrated in the ADOS network. AAC, in co-operation with the Organization of African Unity, yielded fruits through the latter's support, both political and material, with its catalytic effect on the implementation of scientific ventures essential in moving out of geodetic backwardness. Co-operation was further strengthened with the Commission for Geodesy in Africa (CGA) in respect of designing and implementing the standardized gravimetric network in Africa on the basis of experiences acquired during the ADOS project. However, the representative of AAC deplored the lack of co-ordination between institutions with respect to harmonizing their respective positions particularly as regards international issues. In pursuance of resolution 7(V) of the fifth Conference in Cairo, AAC had informed all African institutions to avail themselves of the offer. In view of its experience, AAC hoped to see rational solutions adopted and greater co-ordination of existing machinery leading to better harmonization of institutional activities in line with ECA Conference of Ministers' resolution 477 (XVIII).

38. The representative of Poland presented the report (E/ECA/NRD/CART/34) on the activities of GEOKART concerning its co-operation with African countries. He mentioned operations in the Libyan Arab Jamahiriya where Poland undertook the establishment of first-order gravimetric networks, including crossing the Sahara desert measuring gravity differences existing in the network employing advanced pendulum equipment, thus providing Libya with a precise gravimetric network. Poland's co-operation with Morocco provided cartographic inputs in irrigation projects and inventory of architectural and historic sites. In Nigeria, several towns were mapped at 1:20,000 as well as several other scales for major cities. With regard to co-operation with Algeria, bathymetric measurements of water reservoirs were undertaken. With regard to training, the representative requested the secretariat to correct the impression it had given in its document E/ECA/NRD/CART/32 concerning Poland's role in resolution 7(V) of the fifth Conference. The representative provided the information that showed the number and kind of training courses Poland had conducted for African countries during the period between the two Conferences.

39. The representative of the Federal Republic of Germany spoke of his country's participation in survey work in Africa. He mentioned two major projects which had been executed in recent years, namely the establishment of fundamental geodetic networks in Côte d'Ivoire and Togo by means of transit satellite system. Reference was made to other projects financed under German technical and financial assistance.

40. The representative of France, speaking on agenda item 4, gave an outline of France's participation in the preparation of maps at 1:50,000 as well as revision of several 1:200,000 series for a number of French-speaking countries in Africa under its technical co-operation programme. Other activities included the establishment of geodetic controls in many countries, cartographic project evaluation, introduction of new techniques in space geodesy, airborne remote sensing and digitization of cartographic data. More importantly, France provided training at different levels and for various specializations both in France and in respective co-operating countries in Africa. Since the launching of the SPOT satellite, France had studied new possibilities offered by remote sensing in mapping in Africa.

41. The representative of Czechoslovakia presented his country's report (E/ECA/NRD/CART/22) on different cartographic activities carried out in the following African countries: Algeria (establishment of vineyard cadastre, preparation and realization of the Trans-Saharan Highway); Libyan Arab Jamahiriya (geological mapping); and Egypt (survey of monuments, documentation of excavations and investigations on the recent earth crustal movements in the Nubian desert). In the field of training, he reported that many specialists from African countries had studied sundry cartographic subjects such as geodesy, surveying and cartography at Czechoslovak universities and in other scientific institutions. He further informed the Conference that the Czechoslovak State Geodetic Service did not concern itself mainly with the training of Czech and Slovak geodesists and cartographers for the nation's own economic development, but also was involved in many spheres of international co-operation, exporting geodetic and cartographic products. He stated that the State Geodetic Service would be willing, if requested, to carry out cartographic activities in Africa.

42. The representative of the United Kingdom presented the progress report (E/ECA/NRD/CART/24) on the work of United Kingdom agencies and associated bodies working in Africa on sundry cartographic activities, notably geophysical surveys and remote sensing. He summarized these as follows: support for the African Doppler Survey (ADOS) which was still continuing; working in co-operation with the host survey departments, precise ephemeris Doppler fixes in Cameroon, Kenya and Senegal and was at the time working in Ghana; establishing fixes in Liberia and Sierra Leone; and conducting a programme of national gravity base and infill surveys in Cameroon, the Gambia and Senegal, and an international base transfer between Nairobi, Douala and Dakar gravity stations. The work was in response to the initiative for the projected African Gravity Standardization Network (AGSN). In addition, the United Kingdom had executed individual major mapping projects, including aerial photography and field survey in Botswana, Kenya, Lesotho, Liberia, Malawi, the Sudan, the United Republic of Tanzania and Zambia. In the field of thematic mapping, a number of experiments in the use of both photographic and digital data were conducted. The British Geological Survey, in co-operation with national surveys, continued to assist in geological mapping in a number of African countries. The Land Resources Development Centre produced land resource maps of parts of Kenya, Somalia, the Sudan and the United Republic of Tanzania in support of agricultural development projects in those countries. In addition, surveying and charting of the seas around Africa continued under the British Hydrographic Department. Surveys of harbours and approaches were completed in Kenya and over 80 new charts of new editions of charts of African coasts have been published since January 1983.

43. Although Zimbabwe was not represented at the Conference, it submitted a comprehensive report covering its cartographic activities between 1983 and 1985. The report, contained in document E/ECA/NRD/CART/21, covered all cartographic aspects in the country elaborating on steps taken to move out of the slump that the Surveyor General's Department underwent following the exodus of professionals that preceded the attainment of independence. In presenting the report on behalf of Zimbabwe, a representative of the secretariat underlined important strides the country had taken to belt up for developmental challenges, and underscored in particular the steps the Department had taken. To this end, the report showed efforts made to maintain the services through the acquisition of various surveying, mapping and remote sensing equipment and establishment of link services such as computer-assisted cartography for mapping and the newly established Geographic Information Section. The report also showed how much cartographic services in Zimbabwe had benefitted from technical assistance from a generous Canadian Government. The report concluded by mentioning three encouraging features, namely that the loss of technical surveyors slowed down and stopped, the Department of Land Surveying at the University of Zimbabwe was founded, and that the National Committee on remote sensing and facility had been established. Although Zimbabwe may still have difficult years ahead, long-term prospects were encouraging.

44. The national report of Uganda, document E/ECA/NRD/CART/18, was submitted to the Conference at its closing session and, therefore, could not be presented and considered.

Standardization of specifications for topographical maps in Africa at the scale of 1:50,000 (Agenda item 5)

45. The representatives of the ECA and AAC secretariats presented conference documents E/ECA/NRD/CART/19 (Standardization of specifications for 1:50,000 topographical maps for Africa) E/ECA/NRD/CART/15 (Report of the group of experts on the standardization of specifications for topographical maps in Africa) and E/ECA/NRD/CART/10 (Standardization of technical specifications of basic maps in Africa). In addition, signs based on the symbols contained in the tables annexed to the report of the group of experts meeting held in Addis Ababa from 28 October to 1 November 1985 were introduced.

46. The Conference was expected to examine critically the recommended set of symbols contained in the report of the group of experts and urged their adoption for all future African topographical maps published at the scale of 1:50,000 by all member States and other publishers of such maps for Africa. The objectives of the first-ever attempt to achieve a common specification, leading to standardization and subsequent achievement of homogeneity in the co-ordinate system, had been emphasized by the group of experts in the report presented by the secretariat.

47. The representative of the African Association of Cartography presented a study contained in document E/ECA/NRD/CART/29 which analyzed the results of a survey on the need to standardize specifications particularly for topographical maps in Africa. It provided pointers to the need for a fresh approach to mapping in Africa. The document which was accompanied by a printed specimen of the symbols as recommended by the group of experts also served as a working document for the agenda item.

48. The Conference heard the views of all participants on suitability or otherwise of the recommended sets of symbols for universal application by all who would be preparing topographical maps for Africa.

49. The recommended symbols, a set of 84, were examined individually for universal application on future topographical maps at the scale of 1:50,000 to be prepared for use in Africa.

50. Subject to the substitutes for certain symbols which were considered not suitably representative of the features which they were intended to depict, and which had been agreed upon by consensus, the Conference, after a few modifications unanimously adopted the revised set of symbols for the preparation of topographical maps in Africa at the scale of 1:50,000.

Report of Technical Committee I on manpower development and technical co-operation (agenda items 6 and 7)

51. The assignment given to Committee I covered agenda items 6 and 7 for the Conference, as reflected in the title of its report.

52. The Committee held three sessions in the course of its comprehensive discussions on the following conference papers which had relevance to its work:

E/ECA/NRD/CART/28 Available human resources and training requirements in the area of cartography;

E/ECA/NRD/CART/55 United Nations technical co-operation activities in surveying, mapping and charting (UN/DTCD);

E/ECA/NRD/CART/92 Technical co-operation (RCSSMRS);

E/ECA/NRD/CART/93 Manpower development at regional level (RCSSMRS);

E/ECA/NRD/CART/94 The manpower development: EMA's case (Ethiopia);

E/ECA/NRD/CART/84 Contribution of the Regional Centre for Training in Aerial Surveys to mapping aspects of manpower development (RECTAS);

E/ECA/NRD/CART/85 Consultancy services at the Regional Centre for Training in Aerial Surveys, 1983-1986 (RECTAS);

E/ECA/NRD/CART/25 Training in survey and mapping for overseas students in the United Kingdom (UK);

E/ECA/NRD/CART/32 Coopération dans la formation pratique et théorique et dans le transfert de technologie - GEOKART (Pologne);

E/ECA/NRD/CART/89 Technical co-operation (RECTAS); and

E/ECA/NRD/CART/73 Institutional co-operation (Sweden).

53. In addition to the above, it heard reports from both representatives of member States and observers who outlined comprehensively their agencies' active participation in the development of cartography and remote sensing in some African countries and in the implementation of programmes of the regional and/or subregional institutions whose establishment was a classic example of subregional co-operation in Africa.

54. The representatives of Algeria, Senegal, Burkina Faso, Madagascar and Ethiopia informed the Committee of local and external facilities available for training in their countries as well as future plans for developing their capabilities in cartography and remote sensing. The representative of Burkina Faso requested the Economic Commission for Africa and member States to give equitable support to the Ouagadougou Centre (CRTO) as was the case with other regional centres established under the auspices of ECA.

55. The Director-General of the Regional Centre for Services in Surveying, Mapping and Remote Sensing informed the Committee that one of the main objectives of the Centre was to provide short but intensive specialized technical training in the fields of cartography and remote sensing to the nationals of the subregion towards developing their manpower capability. The Centre had since provided training courses in geodesy, particularly for the ADOS project, to both serving officers from within and outside the subregion. In map making, the Centre had trained participants in "image map production" techniques and "modern trends in mapping". The Remote Sensing Department of the Centre had provided several specific courses in some areas of earth resources development. A total of 871 participants from nearly all the countries in Africa and some from the Middle East had attended the courses.

56. Document E/ECA/NRD/CART/28 entitled "Available human resources and training requirements in the area of cartography" was presented by the Secretary-General of the African Association of Cartography. He said that the survey undertaken revealed not only gross inadequacy in available trained manpower but also an imbalance of manpower in various categories of the profession with geodesy at the rear. The paper contained detailed statistics of the AAC study. It was proposed that optimum advantage should be taken of available African training institutions as against foreign overseas institutions. He cited existing national institutions such as the one in Côte d'Ivoire and another being set up at Brazzaville, the Congo, which were willing to offer their training facilities on a regional basis.

57. The representative of the Regional Centre for Training in Aerial Surveys presented documents E/ECA/NRD/CART/84 and 93 and gave details of the services of its four divisions, namely photogrammetry, photo-interpretation, mapping, and remote sensing. He informed the Committee that short and extended courses were being given in each of the disciplines and elaborated on the number of trainees, courses offered and their levels. A course in photo-interpretation was started only in 1985. The Centre had in the past benefitted from assistance given by various donors which enabled it to develop and formulate its ambitious development plans. RECTAS recently started offering consultancy services in aerial surveys.

58. Representatives of many member States gave accounts of training programmes in their respective national institutions and the kind of external assistance they received in training their nationals especially abroad. Furthermore, many observers, speaking on behalf of their respective institutions and governments, provided valuable information on education and training facilities available in their countries and rendered accounts of technical assistance in mapping and various types of surveys for resources development given to some African countries.

59. The International Society for Photogrammetry and Remote Sensing informed the Committee that it was willing to initiate a programme of co-operation between a training institution in an African country and an appropriate school/university in a developing country whereby the African country could choose the developed country it wishes to enter into co-operation with in manpower development programmes. Such arrangements could be made tenable at universities in Africa or in universities and training institutions in the chosen country. Co-operation among African Governments in training and infrastructural development both on bilateral and multinational basis was widely discussed within the context of transfer of technology to developing countries.

60. The Government of Poland was represented by GEOKART, its mapping organization. A paper on "Co-operation in practical and theoretical training and transfer of technology" (E/ECA/NRD/CART/32) was presented. It outlined the various kinds of the long-term training at university level and short-term in-house on-the-job professional training in the field of surveying and geodesy. The Committee was informed that GEOKART/Poland was willing, if approached, to organize short-term in-house thematic training courses abroad as well as in-house on-the-job training in subjects relating to all branches of geodesy and cartography.

61. The National Land Survey of Sweden (SWEDSURVEY) presented, on behalf of its Government, paper E/ECA/NRD/CART/73, on institutional co-operation. The paper dealt at great length with an effective mapping programme as a fundamental requirement for a national development strategy. It regretted the risk which surveying and mapping were running as a result of the general world economic recession in many developing countries at this crucial time when planning for the future should actually be initiated. It further went on to say that long-term assignments of experts were decreasing as most organizations in the developed countries were either unable or unwilling to release their senior staff as they too needed their services at home. It suggested that one way of solving that problem might be to offer survey organizations in the developing countries the full services of a sister surveying organization in the form of institutional co-operation. It outlined four main areas of activities on institutional co-operation of the SWEDSURVEY, namely technical assistance, consultancy, training and provision of information on and assistance with the purchase of equipment including their repair and servicing. It mentioned that SWEDSURVEY was engaged in institutional co-operation with Ethiopia and Zambia, with the Swedish International Development Authority (SIDA) providing the financing.

62. The Committee concluded its assignment by recommending relevant draft resolutions for the consideration of the Conference.

Report of Technical Committee II on integrated continental geodetic and gravimetric networks in Africa (agenda item 8)

63. The work of the Committee II covered agenda item 8 on "Integrated continental geodetic and gravimetric networks in Africa". Some aspects on geodetic and gravimetric projects which had been covered under agenda item 4 in presentations contained in national reports, were reflected in the report of the plenary meetings. The Committee, therefore, concentrated on issues forming the subject-matter of the following documents:

E/ECA/NRD/CART/26 Some aspects concerning basic geodetic data for the production and updating of large-scale maps (German Democratic Republic);

E/ECA/NRD/CART/31 East African geodetic networks - What next? (United Kingdom);

E/ECA/NRD/CART/33 Coopération technique dans la réalisation du réseau géodesique intégré africain (Pologne);

E/ECA/NRD/CART/34 Proposition de coopération téchnique dans divers domaines de géodesie, cartographie et télédétection (Pologne);

E/ECA/NRD/CART/35 Elaboration of the African Geodetic Integrated Network (Poland);

E/ECA/NRD/CART/44 Global positioning system by satellite (France);

E/ECA/NRD/CART/65 Mapping, charting and geodesy at the Defense Mapping Agency (USA);

E/ECA/NRD/CART/76 Le Réseau Géodesique intégré de l'Afrique oeuvre scientifique commune et aspects conceptuels de mise en oeuvre (AAC);

E/ECA/NRD/CART/79 Consortium africain de traitement des donnés (Algérie);

E/ECA/NRD/CART/91 Present status of the African Doppler Survey (ADOS) Project (RCSSMRS);

E/ECA/NRD/CART/95 Geodesy (Ethiopian Mapping Agency); and

E/ECA/NRD/CART/109 Training workshop in Gravimetry for African Geo-scientists (CGA).

64. During the meetings of Committee II, the Regional Centre for Services in Surveying, Mapping and Remote Sensing (RCSSMRS) submitted an intermediate report on the African Doppler Survey Project (ADOS) outlining the progress achieved from 1981, when it was launched, up till the end of October 1986. The report revealed that by the end of February 1986, 292 ADOS points had been observed in 45 of the 55 countries involved in the project, with 271 of those points having been verified at the Defence Mapping Agency (USA) to have sufficient data for computation. The

Committee was informed that exploratory contacts had been made with "sister" countries which might be willing to assist four more African countries in observing their Doppler positioned points. The remaining countries, including those with insufficient number of points, were urged to carry out their observations in order that the ADOS network might be computed and adjusted as a homogencus net to achieve the original goals. As regards the status of the computations, the Committee was informed that two main computing centres, namely DMAHTC and the European consortium exist. The results of these centres on 223 ADOS points compared favourably, with only 80 of them showing some intolerable discrepancies which would be further investigated by re-observing them. It was noted that the final results will be published in two volumes; one containing the Doppler co-ordinates, and the other the station descriptions. The Committee expressed its delight with the progress made in the implementation of the project and urged countries which have not observed their ADOS points to do so as a matter of urgency so as to complete the project in 1987.

65. The African Association of Cartography, on behalf of the African Second Computing Centre, a consortium comprising Algeria, Côte d'Ivoire and Tunisia, reported on the status of the work done and this was commended by subsequent speakers. It was stressed that the consortium should remain open to all those countries that wanted to join or to assist it in its work. The need was stressed to have a global and co-ordinated vision of all planimetric, altimetric and gravimetric networks which would have the additional effect of strengthening African co-operation and entrust the scientific co-ordination of the geodetic network for Africa to an intergovernmental organization. It then drew the attention of African countries to the danger of limiting ADOS to a scatter of points over Africa and that it was up to African organizations to take appropriate decisions to assess the purpose of a portion of the integrated geodetic network for Africa.

66. The Commission for Geodesy in Africa presented a report on the decisions of the third Symposium on Geodesy in Africa, stressing the impact of the project on an integrated geodetic network for Africa as well as on the ADOS programme.

67. In the discussions which followed, African countries were urged not to neglect classical geodesy at the expense of satellite geodesy which involved a high outlay in equipment both for the observations and the treatment of the results for universal usage.

68. Poland presented a brief review on the types of reference systems in African countries. This led to the conclusion for an imperative need to unify those systems with a view to establishing a common African geodetic datum. Several approaches to achieving the goal were presented. Two other urgent needs for geodetic tasks in Africa were also emphasized, i.e., redefinition or strengthening of existing national datums on the basis of ADOS points and transformation from the ADOS system to the system of existing national control networks in order to strengthen them.

69. A proposal for creating an ad hoc working group was made. Such a group, which will consist of delegates of the African countries and possibly of other scientists from outside Africa would study the different approaches towards establishing an African geodetic datum and suggest an optimum solution. Poland indicated its willingness to take part in the activities of such a working group.

70. The representative of France made a statement on the various methods of classical geodesy, laying special emphasis on large-scale maps particularly cadastre. The representative of the Federal Republic of Germany also made a statement on space geodesy. Observers from the United Kingdom and the United States of America indicated their willingness to provide as much financial assistance as they could for the projects that would be submitted to them.

71. The Committee then concluded its assignment and submitted draft resolutions for the consideration and approval of the Conference.

Report of Technical Committee III on research and development in new techniques in cartography and remote sensing (agenda item 9)

72. The work of Committee III covered agenda item 9, which reviewed recent techniques, research and developments in cartography and remote sensing. The Committee considered the following papers under the agenda item:

E/ECA/NRD/CART/23 Suitability of space photographs taken with the MKF-6 Multispectral Camera for mapping (German Democratic Republic);

E/ECA/NRD/CART/37 Experiences in preparation of maps for the economic activity and environmental management (Poland);

E/ECA/NRD/CART/38 Review of experiences in organization of cartographic application and dissemination of remote sensing (Poland);

E/ECA/NRD/CART/45 The potential of SPOT imagery concerning topo and digital mapping (France);

E/ECA/NRD/CART/46 SPOT: Looking at the earth in order to improve earth management (France);

E/ECA/NRD/CART/47 The SPOT satellite and space maps (France);

E/ECA/NRD/CART/56 Suitability of space photographs (France);

E/ECA/NRD/CART/63 La télédétection au service du développement (Tunisia);

E/ECA/NRD/CART/67 Digital cartographic data production using raster scanning techniques (USA);

E/ECA/NRD/CART/68 Communication du Centre de recherche géographique et de production cartographique (Congo);

E/ECA/NRD/CART/71 Methodological and technological aspects of DTM-assisted digital surveying (USSR);

E/ECA/NRD/CART/78 Nivellement motorise (Algérie);

E/ECA/NRD/CART/80 Presentation d'un système interactif de traitement de l'information géographique (Algérie);

E/ECA/NRD/CART/82 NNSS Transit, GPS, Navstar and inertial technology for national geodetic surveys (Federal Republic of Germany);

E/ECA/NRD/CART/97 Photogrammetry and cartography as applied to highway route location and design (Ethiopia);

E/ECA/NRD/CART/106 The use of satellite data in the production of topographical maps (RCSSMRS).

73. The Committee heard reports by representatives of the following observer countries: France, German Democratic Republic, Poland, United States of America, Federal Republic of Germany and the Union of Soviet Socialist Republics. The Congo, Ethiopia and Algeria also presented written reports while the representatives of Côte d'Ivoire, Ghana and Nigeria made verbal contributions during the discussions on their countries' keen interests to engage in research and in the adoption of modern techniques in cartography and remote sensing for rapid provision of geographic information and data for the development of their economies.

74. The representative of France discussed at length his country's papers and highlighted the following main points:

(a) The scientific and economic interest to include the use of the stereoscopic SPOT images inside the cartographic process to establish topographic base maps in Africa;

(b) The urgency to produce large-scale maps that will be digitized for inputs into urban surveying, cadastral surveying and land information systems; and

(c) The application of GPS positioning system to cartographic ground control in order to minimize the delay and the cost of field work.

75. The representative of Poland outlined the research activities in his country in the field of cartography, including the production of atlases, taking into consideration the phenomenal changes in contemporary Africa. He expressed his country's willingness and readiness to exchange experiences gained in surveying, mapping and remote sensing with African member States. The Committee was further informed that Poland was equally prepared to co-operate with African member States in producing by "Typhlo-cartographic" technique maps for visually handicapped persons.

76. The representative of the German Democratic Republic presented the paper on "Suitability of space photographs taken with the MFK-6 multispectral camera for mapping". The Committee was informed that photography, using the MFK-6 camera installed with a complete system of instruments, computers and software for information extraction, was useful for visual and digital photo-interpretation, aerotriangulation, production of line maps and photomaps, geometric data, extraction and map revision. For small-scale mapping at 1:100,000, the MFK-6 satisfies the planimetric accuracy of a mean error of 0.5 mm for distinct contour points.

77. The Union of Soviet Socialist Republics (USSR), in its paper on "Methodological and technological aspects of DTM-assisted digital surveying", outlined basic approaches to an automated technology of digital terrain simulation for large-scale surveying and structural designs as well as for solving pertinent problems in some sectors of the national economy.

78. The paper on Digital cartographic data production using raster scanning techniques was presented by the United States Geological Survey, representing the Government of the United States of America. It contained an account of a feasibility study on the building of a digital cartographic data base for the 1:100,000 scale USGS map series to facilitate automated data capture for the use of the U.S. Bureau of the Census as a geographic support system for the 1990 Decennial Census of Population and Housing. The Committee was informed that the USGS and the Census Bureau was going to create a programme on a national digital cartographic data base from 1:100,000 scale maps by 1987 which will enable the USGS to support the widespread use of geographic information systems for a host of resource management, area analysis and planning activities.

79. The representative of the Federal Republic of Germany, after outlining some of the navigation systems in use, concentrated on the Transit, the Navy Navigation Satellite System (NNSS) by means of which many national control networks in Africa, among other continents, had been established. The ongoing ADOS project was mentioned as having largely used the Transit-NNSS for the observed Doppler counts between two time marks for the positioning of the Doppler points.

80. The representatives of Algeria and Côte d'Ivoire informed the Committee of their respective countries' research and development programmes. The representative of Algeria reported in particular on his country's experience in the preparation and mounting of a motorized levelling equipment and that the test carried out in 1985 confirmed its advantage for rapid levelling over classical method to achieve an accuracy of 1 mm/km. The test would continue and production programme had been planned for first-order levelling in 1987. INC started early in 1986 to introduce the application of an interactive system of geographic data processing and hoped to go into automated cartography for the publication of an atlas. The two countries are involved in intra-African training programmes in new techniques in remote sensing with external assistance.

81. The representative of the Congo reported on two programmes of research, namely a sociological and geographic study of three secondary urban centres (Mossendjo, Owando and Ouesso) and the preparation of one metallurgical map.

82. The representative of Ethiopia presented a research paper on the applications of photogrammetry and cartography to road construction and design, and appealed for further research in this area.

83. The representative of the International Society for Photogrammetry and Remote Sensing (ISPRS) advised the Committee that all results of research, investigations and experiments by any organization should, as a matter of routine, be disseminated for the benefit of member States. He also brought to the notice of the Committee the use of meteorological and remote sensing satellite for resource mapping. It was stated further that scientific research was succeeding at international level.

The Committee noted that there were no research activities undertaken by the national cartographic institutions and that Africa's centres should be involved in carrying out experiments to test the suitability of new techniques to meet African mapping needs.

84. The representative of the Regional Centre for Services in Surveying, Mapping and Remote Sensing (RCSSMRS) presented a report on his Organization's research activities using Landsat Satellite imageries for the production of orthophoto maps and stated that a manual, outlining the techniques involved, would be published and sent to cartographic institutions of member States. He also informed the Committee of the successful experiment carried out in map revision, with the 1:250,000 East African map series as base and supplemented with information from Landsat imageries.

85. The representative of the Regional Remote Sensing Centre (CRTO) outlined the Centre's activities in carrying out investigations on resource development and monitoring of desertification, and preparation of thematic maps using satellite imageries.

86. The representative of the ECA secretariat appealed to the regional centres and to the member States who functioned as co-investigators in the metric camera and the large format camera experiments to complete their investigations as a matter of urgency, in order to be able to assess the suitability of the new products for topographical mapping in Africa as well as to compare costs with the conventional methods of preparing topographical maps.

Year of Cartography in Africa (agenda item 10)

87. This item of the agenda was presided over by the Chairman of the Regional Organizing Committee for the Year of Cartography in Africa, Mr. M'funi-Tshiamanyanu, Director, ESCAS Department of OAU, who introduced the Committee as follows:

Chairman	Mr. M'funi-Tshiamanyanu (OAU)
Co-Chairman	Mr. Funso Olujohungbe (ECA)
Vice-Chairmen	Messrs. C. Fezzani and Asfaw Fanta (representing AAC)
Secretary	Mr. E. Kasaija Nyakana (ECA)
Members:	Secretary-General of African Remote Sensing Council and President of the Commission for Geodesy in Africa

88. The Chairman of the Regional Committee said that in order to celebrate the Year of Cartography in Africa during the sixth United Nations Regional Cartographic Conference for Africa, a programme of keynote addresses by eminent scientists had been arranged. The addresses were followed by reports of the Regional Organizing Committee and a few national committees established for the purpose of implementing ECA and OAU resolutions in that regard.

Three keynote addresses were delivered by:

Prof. O.O. Ayeni, Director of RECTAS on "Manpower development and cartography and remote sensing in Africa";

Dr. C. Fezzani, Secretary-General of AAC on "Cartography and development";

Mr. Tesfaye Shiferaw, Chairman, Department of Geography, Addis Ababa University on "Geography use of cartography for resource development".

89. Following the presentation of the keynote addresses, the secretariat was requested to issue a special commemorative bulletin containing the speeches for distribution to all the participants and cartographic institutions in Africa.

Report of the Regional Organizing Committee

90. The Co-Chairman of the Committee presented the report as contained in document E/ECA/NRD/CART/20. He recalled that after the fifth Conference had proposed 1986 as the Year of Cartography in Africa, the Executive Secretary of ECA brought the matter before the ECA Conference of Ministers who, in April 1983, declared 1986 as the "Year of Cartography in Africa". The Secretary-General of OAU also brought the matter before the twenty-first summit of Heads of State and Government of OAU, who endorsed the declaration of 1986 as the Year of Cartography in Africa.

91. The Co-Chairman of the Regional Organizing Committee then presented an outline of the Committee's commemorative activities for the Year. These included dissemination of information and urging member States to form national committees, then published a joint press release by the Secretary-General of the OAU and the Executive Secretary of ECA on the Year. This press release had been sent to all member States for publicity through national mass media. He emphasized that the publicity for the Year was aimed at policy-makers, decision-makers, people in the field of earth sciences as well as the general public. It was also decided that the celebration of the Year of Cartography should be extended to April 1987 to allow member States to complete the activities they had embarked upon. The active role played by AAC in the conception of the Year and publicity among its member States was commended.

National reports

92. The representative of the following member States presented brief reports on the activities relating to the commemoration of the Year in their respective countries: Algeria, Burkina Faso, Cameroon, Côte d'Ivoire, Ethiopia, Gabon, Ghana, Nigeria, Senegal, Tunisia, Zaire. Other member States submitted reports which were circulated at the Conference.

93. The reports highlighted activities undertaken in each of the member States concerned to mark 1986 as the Year of Cartography. The activities included the establishment of inter-ministerial and inter-sectoral national committees which were charged with the responsibility of organizing the celebrations of the Year of Cartography in Africa. The activities to mark the Year included organization of cartographic exhibitions, open days, round-table meetings, seminars to discuss the role of cartography and remote sensing in socio-economic development, publicity campaigns on the Year through national newspapers, radio and television. Some member States had published maps and issued commemorative stamps to mark the Year of Cartography in Africa.

94. Several representatives of member States expressed satisfaction with the extension of the time to April 1987 for the Year of Cartography. The representative of Tunisia urged that African countries should observe a day for cartography each year.

Reports of institutions and organizations

95. The representatives of the Regional Centre for Training in Aerial Surveys (RECTAS), Regional Centre for Services in Surveying, Mapping and Remote Sensing (RCSSMRS), African Association of Cartography (AAC) and Commission for Geodesy in Africa (CGA) also presented reports on the activities of their institutions to mark the Year of Cartography in Africa. The activities included the organization of symposia on cartography and remote sensing as a tool for development in Africa, map exhibitions, demonstration of map-making techniques and assisting in the publicity of the Year.

96. In conclusion the Chairman of the Regional Committee thanked the member States and organizations which had organized activities to mark the Year and urged those which had not yet done so, to endeavour to organize similar activities in the remaining time, which had been extended to April 1987.

Adoption of the report of the Conference (agenda item 11)

97. The Conference examined the draft report paragraph by paragraph and made the necessary amendments by consensus. The report and the resolutions of the Conference was thereafter unanimously adopted.

Date and venue of the seventh Conference (agenda item 12)

98. The Conference agreed to convene the seventh Conference at the headquarters of the Commission in Addis Ababa, Ethiopia, in 1989.

99. Concerning the venue, the Conference agreed that any member State wishing to host the Conference should inform ECA by 31 December 1987.

Closing of the Conference (agenda item 13)

100. At the closing session, the Conference adopted by acclamation a vote of thanks to the secretariat of the Economic Commission for Africa for the excellent arrangements made in organizing the Conference. It also expressed its appreciation to the Chairmen of the bureau and the Technical Committees as well as to the officers of the Conference for the excellent way in which they conducted the meetings and also its gratitude to the officers and staff of the ECA secretariat for their hard work which contributed to the success of the sixth Conference.

Annex

RESOLUTIONS

Resolution 1 (VI). Creation of public awareness on potentials of cartography and remote sensing as tools for economic development

The Conference,

Conscious of the low level of application of cartography and remote sensing in most African countries in planning and development of natural resources,

Concerned about the lack of sufficient awareness by policy and decision makers and economic planners of the role which inputs from cartography and remote sensing can contribute to rational development of the national economies,

Aware that most higher institutions of learning in Africa do not offer courses in cartography and remote sensing,

Appreciating the need for educating and sensitizing the user community and the public at large on the role of cartography and remote sensing as indispensable tools for economic development,

1. Recommends that the existing regional centres and national mapping institutions of member States organize seminars and workshops for decision makers, economic planners and researchers on appropriate topics in cartography and remote sensing and their relevancy to planning and development;

2. Further recommends that higher institutions of learning establish departments or faculties of cartography and remote sensing as appropriate.

Resolution 2 (VI). Large-scale surveys and information systems

The Conference,

Conscious of the need for African countries to acquire rapidly functional and comprehensive cartographic equipment,

Considering that such equipment covers all geographic data bases particularly those relating to land use,

Taking into account the economic importance of well-adapted technologies such as that may be provided under technical co-operation for the strengthening of cartographic capacities of developing countries,

Noting that there exists the need to appreciate the usefulness of large-scale surveys and the requirements for the implementation of national related survey programmes embracing numerical, cadastral and urban surveys and the establishment of geographical and land information systems,

1. Requests the Executive Secretary of the Economic Commission for Africa to seek external financial support to organize a seminar for African countries on technologies suitable in building geographic information data base;

2. Urges member States to give thought to the early establishment of land and geographic information systems data base.

Resolution 3 (VI). Meeting of the African ministers responsible for surveying, mapping and remote sensing

The Conference,

Recalling the Lagos Plan of Action and the Final Act of Lagos adopted by the Assembly of OAU Heads of State and Government at its first extraordinary session devoted exclusively to prescribing measures for the implementation of the Monrovia Strategy for the economic, social and cultural development of Africa,

Noting that among the strategies adopted was the development and strengthening, by member States, of their national surveying and mapping institutions through rating them high among their national priorities as well as the establishment of those institutions where they do not exist,

Aware that the aforementioned goals can be achieved faster if policy and decision makers in the fields of surveying, mapping and remote sensing are involved directly in the implementation of the various programmes addressing the economic crisis in the continent,

Realizing that up till now there has been no forum for the ECA ministers responsible for surveying, mapping and remote sensing to meet and map out strategies that will contribute inputs into the judicious planning and rational exploitation and utilization of their natural resources endowments as well as to the measures for achieving the rapid implementation of the Lagos Plan of Action and the Final Act of Lagos and the adopted priority programmes for the economic recovery of Africa,

Calls upon the Executive Secretary of the Economic Commission for Africa to convene as soon as possible a conference of all African ministers responsible for surveying, mapping and remote sensing as is happening presently in other sectors to consider, among other matters, measures to be taken to implement effectively the Lagos Plan of Action and the priority programmes adopted for its accelerated implementation.

Resolution 4 (VI). Harmonization of activities in cartography and remote sensing

The Conference,

Conscious of the affinity and complementarity of the sciences of cartography and remote sensing,

Aware of the advantages that will accrue from the harmonization and proper co-ordination of cartography and remote sensing activities in the form of an integrated approach to national economic development,

Mindful of the steps already taken by the Economic Commission for Africa towards the merger of the African Remote Sensing Council and the African Association of Cartography in order to create a machinery for efficient co-ordination of regional cartographic and remote sensing activities in Africa,

1. Recommends that member States work towards the realization of the objectives by regrouping their cartographic and remote sensing institutions into a single organization which shall be responsible for the co-ordination of the two disciplines so as to derive maximum advantages for an integrated national economic development;

2. Further recommends that national delegations to future Regional Cartographic Conferences should also include representatives of user organizations especially from higher institutions of learning.

Resolution 5 (VI). Evaluation of training needs and manpower requirements in cartography and remote sensing

The Conference,

Recalling resolution 6 (V) of the fifth United Nations Regional Cartographic Conference for Africa concerning the evaluation of training institutions and their structures in Africa,

Noting that the Economic Commission for Africa and the African Association of Cartography had been able to carry out training needs and manpower requirements only in some member States and that the study has not been completed,

Mindful of the inadequate resources in the past to undertake missions to member States for the purpose of data collection to accomplish this important assignment,

Aware that relevant information in this regard can also be collected through questionnaires in addition to missions to member States,

1. Requests the Economic Commission for Africa to provide adequate resources for undertaking such missions to collect the data required to implement fully and in a satisfactory manner the said resolution;

2. Urges all member States to complete expeditiously the questionnaires that may be sent to them in that regard so as to enable the Economic Commission for Africa to complete the work started on the recommendations of the Ad hoc committee set up by the Economic Commission for Africa and the Organization of African Unity on the restructuring of the existing regional and subregional training centres to be able to meet member States' manpower requirements in cartography and remote sensing;

3. Calls upon the Economic Commission for Africa to submit a report on its findings to all member States not later than one year after the approval of the report of the sixth Conference by the ECA Conference of Ministers.

Resolution 6 (VI). Strengthening of existing regional centres in cartography and remote sensing and co-ordination of fellowship awards

The Conference,

Considering the importance Governments of member States attach to, and the needs expressed for training in the areas of cartography and remote sensing to provide tools for the development of their natural resources,

Noting the inadequacy of trained manpower in surveying, mapping and remote sensing at technician, technological and professional levels, expressed in reports presented to the Conference,

Conscious of the fact that the technology of cartography and remote sensing is advancing at a fast rate with high outlay which does not justify the establishment of new regional training centres in these technologies under the present financial and economic crises faced by African countries,

Appreciative of the offers of fellowships made by non-African governments and various international agencies participating in the present Conference to supplement African endeavours in raising the level of their cartographic and remote sensing capabilities,

Aware that the services of the existing regional centres which were established at the instance of the African countries themselves to provide specialized services and training to their nationals in the fields of cartography and remote sensing are not being fully utilized,

Concerned that these centres are not operating to their full capacity due to inadequate moral, material and financial support of countries in the respective subregions in which the training centres are located,

Appreciating the continuing support being given to the centres by international agencies and individual donor countries,

1. Urges member States to provide moral, material and financial support to these centres, and to fully utilize the specialized training and services being offered by them;

2. Appeals to all African countries that are not yet signatory members to the agreements establishing these centres to do so as a matter of urgency and provide them with necessary support;

3. Requests the regional centres to review periodically their training programmes and curricula in order to meet prevalent manpower development needs of member States;

4. Appeals to the international agencies and donor countries to increase their technical co-operation and financial support to the regional centres so as to enable them develop their training and technical capabilities to meet most member States' needs in their areas of competence;

5. Recommends that offers for fellowship awards should henceforth be channelled and co-ordinated through ECA;

6. Requests ECA to ensure an equitable distribution of such fellowships among African regional training institutions.

Resolution 7 (VI). Technical co-operation

The Conference,

Recognizing that the technology of cartography and remote sensing is of a regional nature especially with regard to satellite geodesy and satellite receiving stations,

Mindful of the low level of economies of most African countries vis-à-vis the high cost of development of cartographic and remote sensing technologies,

Aware of the successful establishment of regional and subregional economic groupings such as PTA, SADCC, ECOWAS and IGADD and regional and subregional centres in cartography and remote sensing,

Recalling the strategy set out in the Lagos Plan of Action, APPER and the aims and goals of the United Nations Programme of Action for African Economic Recovery and Development,

Appreciating the kind offers of developed countries to provide technical assistance to African cartographic institutions,

Convinced of the usefulness of such assistance in acquiring, among others, the cartographic equipment required for providing inputs into the rational planning of the national resources thereby resulting in the economic development of individual countries,

Further appreciating the technical co-operation that has been provided to member States as well as to the regional centres by international agencies and individual donor countries in strengthening and improving their manpower and technical capabilities in the fields of geodesy, cartography and remote sensing,

Aware of the need for a genuine transfer of technology in cartography,

1. Urges African countries to join hands to develop and intensify their technical co-operation at subregional and regional levels so that the burden of development of these high-cost technologies could be shared;

2. Requests the regional centres to direct their programmes towards the implementation of the Lagos Plan of Action in the areas of inventorying and development of natural resources for the realization of APPER and the United Nations Programme of Action for African Economic Recovery and Development;

3. Appeals to international agencies and individual donor countries to continue and increase their level of technical co-operation, material, financial and manpower development, to enable the countries of the Africa region to develop their natural resources in order to improve the level of the social and economic status of their peoples;

4. Recommends that African cartographic institutions should:

(a) Ensure that the assistance provided contributes effectively to the implementation of specific developmental projects;

(b) Strive to ensure that such assistance results in the acquisition of equipment suited to the country, the dispatch of suitable experts, the training of nationals in appropriate technologies;

(c) Make provision for taking over on the completion of the project;

(d) Utilize regional services for the retraining of trainers and training of maintenance staff;

(e) Establish equipment maintenance units within their institutions.

Resolution 8 (VI). Assistance to Chad for the establishment of a national cartographic and remote sensing institution

The Conference,

Mindful of the relevant paragraph of Chapter III of the Lagos Plan of Action on institutional building at national level in cartography and remote sensing as a means of achieving the capabilities for undertaking surveying and mapping projects essential for development,

Recalling resolution 3 of the second United Nations Regional Cartographic Conference for Africa on the promotion of interest in cartographic work,

Aware of the inadequacies of cartographic services in the development of the resources of many African countries,

Noting that some African countries are still to establish their national cartographic institutions, and that some of those existing require strengthening to enable them respond to the cartographic needs of member States in contributing to the solutions of the problems that continue to afflict many African countries,

Appreciating the strong feeling of the Chadian representation for assistance to establish its national cartographic institution,

1. Invites member States of the Economic Commission for Africa, the Organization of African Unity, competent international organizations, African and non-African countries which have the means to assist the Government of Chad, as a matter of urgency, in establishing its own national cartographic and remote sensing services;

2. Appeals to member States which are still to establish their national institutions to put into motion necessary machinery to do so in order to achieve the accelerated implementation of the priority programmes adopted by the Heads of State and Government including the United Nations Programme of Action for African Economic Recovery and Development.

Resolution 9 (VI). Standardization of specifications

The Conference,

Recognizing that an expert group studied exhaustively the need to standardize specifications for topographical maps at basic map scales, and had established a set of symbols which it recommended for application in Africa,

Conscious of the benefits accruing from uniform map presentations as essential input in the study, preparation and execution of regional development projects,

1. Endorses the principle for the adoption of uniform standardized specifications for topographical maps in Africa at the scale of 1:50,000;

2. Requests the Economic Commission for Africa in close collaboration with the African Association of Cartography to publish a set of approved specifications as amended and to send the final text and specimen to all cartographic institutions of member States and to known map publishers outside Africa;

3. Strongly recommends that all topographical maps series at the scale of 1:50,000 should be published using the symbols adopted by the Conference for the "Standardized Specifications for Africa" (SSA);

4. Further requests the Economic Commission for Africa to convene a meeting of experts within the next 12 months for the purpose of standardizing specifications in respect of topographical maps at other scales, establish the presentation of marginal data, colour schemes, appropriate map projections, and to review the comments received from publishers who might have attempted using the adopted specifications;

5. Accepts the offer of Morocco and the Regional Centre for Services in Surveying, Mapping and Remote Sensing to publish a mock map based on the adopted specifications;

6. Requests the Government of Morocco and any other African institutions to work jointly with the Economic Commission for Africa and the African Association of Cartography in the early publication of sets of maps according to the adopted specifications;

7. Invites all member States to report to the seventh Conference on the progress in implementing aspects of this resolution.

Resolution 10 (VI). African Doppler Survey

The Conference,

Recalling the launching of the ADOS Project in 1980 by the Commission for Geodesy for Africa and the resolution of the third United Nations Regional Cartographic Conference for Africa at Cairo in 1983 on ADOS,

Conscious of the scientific importance of planimetric, altimetric and graviametric components for an integrated geodetic network for Africa,

Further recalling resolution 8 (V) A of the fifth United Nations Regional Cartographic Conference for Africa calling upon all member States to ensure the success of ADOS,

Noting that some African countries are yet to establish their own Doppler points as part of the ADOS network,

Taking cognizance of the expressed desire by those countries which are yet to establish their Doppler points under ADOS to obtain appropriate support to do so,

Taking note of the report of the African Association of Cartography on the importance of establishing the integrated geodetic network for Africa as soon as possible,

Appreciating the effective contribution made by member countries, the Economic Commission for Africa, the African Association of Cartography, the Regional Centre for Services in Surveying, Mapping and Remote Sensing as well as sister countries such as the UK, the United States of America, France, the Federal Republic of Germany, Belgium, the USSR and Poland and international organizations such as LAG, CSTG, COSPAR and ICSU in the implementation of ADOS which has resulted in the achievements so far made in the project,

1. Recommends the continuation of the ADOS project and its post-phases;

2. Urges African countries to participate actively in the completion of this operation by selecting the remaining points that need to be observed;

3. Urges those African member countries which have not completed their ADOS project observations to do so as soon as possible;

4. Encourages the activities of the Nairobi Centre and the African Consortium for data processing;

5. Calls upon African countries and sister States to continue their support (both technical and financial) for the final computation, publication and dissemination of the ADOS results;

6. Recommends:

(a) That all African countries utilize the ADOS and other geodetic data for the redefinition of the national datums as well as for determining a unified datum for Africa;

(b) That African countries make an effort to protect from destruction all the monumented ADOS points in their countries bearing in mind the high cost involved in the implementation of the project and their re-establishment if destroyed and the importance of those established points in the future geodetic and geophysical studies and development;

7. Further recommends that the global design approach to the integrated geodetic network for Africa as proposed by the African Association of Cartography be adopted and that a duly authorized intergovernmental organization be assigned the responsibility of co-ordinating the activities relating to its implementation.

Resolution 11 (VI). The African gravity standardization network

The Conference,

Recalling the resolutions on the need for the establishment of an integrated, homogeneous, continental reference gravity network in Africa, adopted at the second and third International Symposium on Geodesy in Africa in 1981 and 1986 respectively; recommendations of the International Gravity Bureau Working Group 2 (IGB WG 2) of the International Union of Geodesy and Geophysics Congress of Hamburg in 1983; the International Gravity Commission Workshop in Paris; and the African Association of Cartography/Commission for Geodesy in Africa third International Symposium on Geodesy in Africa in Yamoussoukro in 1986,

Considering the scientific, technological and economic importance of a unified gravimetric network for the entire African continent,

Appreciating the contribution of the Economic Commission for Africa and the United Nations Development Programme and other institutions in providing necessary logistics and backstopping for the successful take off and implementation of the African Doppler Survey (ADOS) project,

Aware of the progress already made in developing an integrated geodetic network for Africa from contributions made by the Commission for Geodesy in Africa, the LAG/COSPAR joint commission of the International Co-ordination of Space Techniques for Geodesy and Geodynamics and the implementing Agency (the Regional Centre for Services in Surveying, Mapping and Remote Sensing, Nairobi) in collaboration with the African Association of Cartography,

Conscious of the urgent need for gravity data to supplement the ADOS data towards achieving a common geodetic datum for Africa,

1. Endorses all the steps taken so far in the establishment of the integrated continental gravity network: the African Gravity Standardization Net (AGSN);

2. Requests the Economic Commission for Africa and the Organization of African Unity to mobilize resources from within and outside Africa towards the successful implementation of this important second regional programme (ACSN) for Africa in the shortest possible time;

3. Calls on the international community to offer assistance for the implementation of the AGSN project through multinational or bilateral co-operation;

4. Recommends that all African countries co-operate and render full support for achieving the objectives of the AGSN project.

Resolution 12 (VI). African technical review

The Conference,

Recalling resolution 7 of the second United Nations Regional Cartographic Conference for Africa which called upon the Economic Commission for Africa to publish, on six-monthly or yearly basis, an analytical information bulletin that will sum up the progress achieved in various fields of cartography,

Further recalling the relevant chapters of the Lagos Plan of Action on the development of scientific and technological research in Africa,

Considering that African action in adapting available technologies and techniques particularly in areas of cartography and remote sensing would provide valuable inputs into the efficient and rational exploitation of natural resources of member States,

1. Requests regional centres and national research institutions to undertake research projects and programmes in new technologies;

2. Further requests member States and non-African countries that have carried out research in the area of technology development to inform the Economic Commission for Africa of the results obtained in order to ensure their wider dissemination to African countries;

3. Recommends the publication of an African technical review under the auspices of the Economic Commission for Africa and the African Association of Cartography and charges AAC to collect and select the articles, and ECA to edit the magazine;

4. Urges all African countries to actively contribute to this review;

5. Recommends that the review should be published jointly by ECA and AAC which will ensure its widest distribution.

Resolution 13 (VI). Research and development in recent techniques in cartography and remote sensing

The Conference,

Recalling the Lagos Plan of Action and the Final Act of Lagos, Africa's Priority Programme for Economic Recovery and the United Nations Programme of Action for African Economic Recovery and Development urging the African countries to take inventory of their natural resources with a view to developing them for the benefit of the African people,

Noting the inadequacy of topographical and thematic maps for development planning as outlined in the reports of the Economic Commission for Africa and the African Association of Cartography to the Conference,

Recognizing that it will take a long time and involve considerable financial and human resources to prepare line maps which can provide inputs into the solution of problems identified in the adopted priority programmes as well as in their implementation,

Aware of the advancement in space technology with particular reference to production of images and photographs from space which are adaptable for topographic mapping, inventorying, exploitation, monitoring and development of natural resources,

1. Recommends that countries of the region also adapt remote sensing technologies for mapping, inventorying, exploitation and development of their natural resources;

2. Requests regional and national centres to embody in their research programmes those components that will test the suitability of the recent techniques in space technology for mapping;

3. Appeals to international organizations and developed countries to support African efforts in the use of remote sensing technology for data collection and natural resources development.